

What is claimed is:

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1. A liquid sampler comprising:
a metering pump including a cylinder having opposite
end openings and a cylindrical cavity, a piston inserted in the
5 cavity from one of the openings of the cylinder, and a driving
source for reciprocally and linearly moving the piston; and
a pipette directly connected to the other opening of the
cylinder.
2. A liquid sampler as set forth in claim 1, wherein the
10 pipette, the cylinder and the driving source are disposed in a
coaxial relation.
3. A liquid sampler as set forth in claim 1, wherein the
cylinder has a channel extending from an outer circumference
thereof to the cavity for supplying a cleaning liquid into the
15 cavity.
4. A liquid sampler as set forth in claim 3, further
comprising an electromagnetic valve provided in the vicinity of
the cylinder for controlling the supply of the cleaning liquid
into the cavity via the channel.
- 20 5. A liquid sampler as set forth in claim 1, wherein the
pipette is a disposable pipette which is directly connected to
the other opening of the cylinder in a detachable manner.
6. A liquid sampler as set forth in claim 1, further
comprising a driving mechanism for moving the metering pump
25 having the pipette in at least one-dimensional directions.
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7. A liquid sampler as set forth in claim 1, further comprising a driving mechanism for horizontally and vertically moving the metering pump having the pipette.

8. A liquid sampler as set forth in claim 1, wherein the driving source comprises a stepping motor, and a converting section for converting a rotational motion of the stepping motor into a linear motion and transmitting the linear motion to the piston.

9. A liquid sampler as set forth in claim 1, further comprising a liquid surface detecting section for detecting contact of a distal end of the pipette with a liquid surface.

10. A liquid sampler as set forth in claim 9, wherein the pipette is composed of an electrically conductive material,

15 wherein the liquid surface detecting section detects the liquid surface on the basis of a change in electrostatic capacity between the pipette and the liquid surface.

11. A blood analyzer comprising:

20 a liquid sampler which comprises a metering pump including a cylinder having opposite end openings and a cylindrical cavity, a piston inserted in the cavity from one of the openings of the cylinder, and a driving source for reciprocally and linearly moving the piston, and a disposable pipette attached to the other opening of the cylinder in a detachable manner;

a driving mechanism for moving the liquid sampler horizontally and vertically;

a liquid surface detecting section for detecting contact of a distal end of the pipette with a liquid surface;

5 a controlling section for controlling the pump driving source and the driving mechanism upon reception of a signal from the liquid surface detecting section;

a specimen vessel for containing a blood specimen;
and

10 an analyzing section for analyzing a test sample quantitatively dispensed out of the blood specimen from the specimen vessel by the liquid sampler.

12. A blood analyzer as set forth in claim 11, wherein the analyzing section comprises a detection member which
15 includes a channel having an inlet and an outlet provided at opposite ends thereof and an orifice provided between the inlet and the outlet, and a detection section for detecting a change in impedance of the test sample when the test sample flows through the orifice.

20 13. A blood analyzer as set forth in claim 12, wherein the controlling section functions to control the pump driving source and the driving mechanism so as to cause the metering pump to quantitatively suck the blood specimen from the specimen vessel via the pipette, and quantitatively inject the
25 sucked specimen as the test sample into the inlet of the

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detection member via the pipette.

14. A blood analyzer as set forth in claim 12,
wherein the analyzing section includes a reagent vessel
for containing a predetermined volume of a reagent,

5 wherein the controlling section functions to control the
pump driving source and the driving mechanism so as to cause
the metering pump to quantitatively suck the blood specimen
from the specimen vessel, quantitatively inject the sucked
specimen into the reagent vessel to dilute the specimen, and
10 quantitatively inject the diluted specimen as the test sample
into the inlet of the detection member.

15 A blood analyzer as set forth in claim 14, wherein the
controlling section calculates the number of red blood cells in
the blood specimen on the basis of the change in the
15 impedance detected by the detection section.

16. A blood analyzer as set forth in claim 12,
wherein the analyzing section includes a reagent vessel
for containing a predetermined volume of a reagent and a
hemolyzing agent vessel for containing a hemolyzing agent,

20 wherein the controlling section functions to control the
pump driving source and the driving mechanism so as to cause
the metering pump to quantitatively suck the blood specimen
from the specimen vessel, quantitatively inject the sucked
specimen into the reagent vessel to dilute the specimen, suck
25 the hemolyzing agent from the hemolyzing agent vessel, inject

the sucked hemolyzing agent into the reagent vessel to hemolyze the diluted specimen, and quantitatively inject the hemolyzed specimen as the test sample into the inlet of the detection member.

5 17. A blood analyzer as set forth in claim 16, wherein the controlling section calculates the number of white blood cells in the blood specimen on the basis of the change in the impedance detected by the detection section.

10 18. A blood analyzer as set forth in claim 11, wherein the analyzing section includes a reagent vessel for containing a predetermined volume of a reagent, a hemolyzing agent vessel for containing a hemolyzing agent, and an absorbance measuring section for measuring the absorbance of a content in the reagent vessel,

15 wherein the controlling section functions to control the pump driving source and the driving mechanism so as to cause the metering pump to quantitatively suck the blood specimen from the specimen vessel, quantitatively inject the sucked specimen into the reagent vessel to dilute the specimen, suck
20 the hemolyzing agent from the hemolyzing agent vessel, and inject the sucked hemolyzing agent into the reagent vessel to hemolyze the diluted specimen.

19. A blood analyzer as set forth in claim 18, wherein the controlling section calculates the amount of hemoglobin in the
25 blood specimen on the basis of the absorbance measured by

the absorbance measuring section.

20. A blood analyzer as set forth in claim 18, wherein the absorbance measuring section includes a green LED for irradiating the content with light, and a photodiode for
5 detecting light transmitted through the content.

21. A blood analyzer as set forth in claim 11, further comprising a disposal section for collecting the pipette after the pipette is detached from the liquid sampler, wherein the controlling section further functions to control the driving
10 mechanism so as to detach the pipette from the liquid sampler after use thereof and collect the detached pipette in the disposal section.

22. A blood analyzer as set forth in claim 21, further comprising a pipette holder for holding a new disposable
15 pipette, wherein the controlling section further functions to control the driving mechanism so as to attach the new disposable pipette in the pipette holder to the liquid sampler after the used pipette is detached from the liquid sampler.

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